NATIONAL WEATHER SERVICE - MEDFORD, OREGON

Fall 2015

Volume 4, Issue 3

The Crater Chronicle

Fall Begins September 23rd at 1:20 am PDT.

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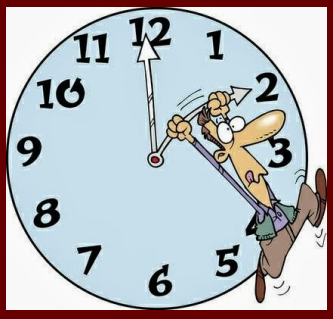


Daylight Savings Time Ends November 1st! Set Your Clocks Back One Hour!

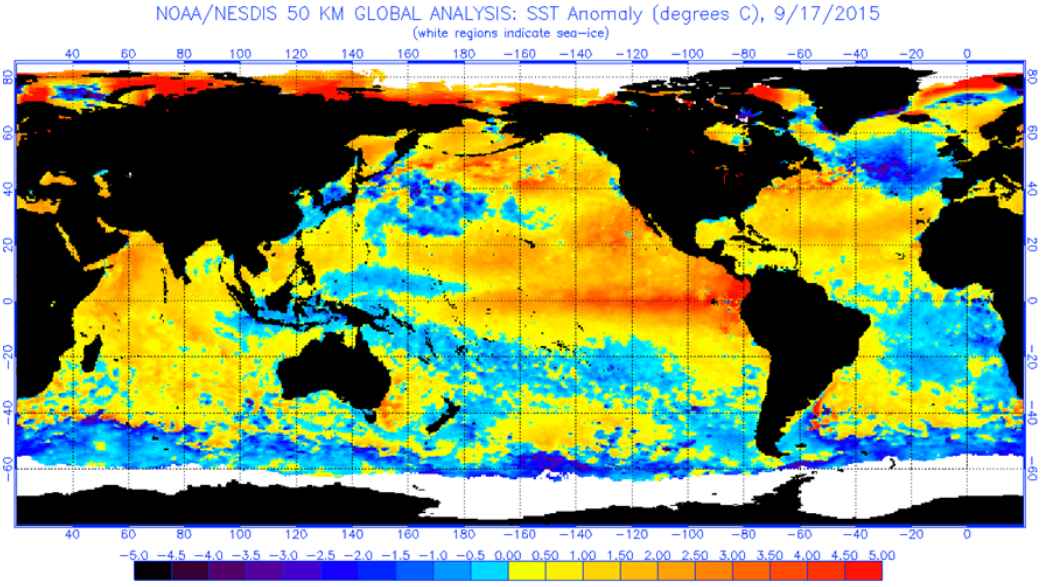
INSIDE THIS ISSUE

El Nino: What It Means for the Medford Forecast Area

Brett Lutz, *General Forecaster*

What's the Current Status of El Nino?

Water temperatures have warmed further during the last year in the Equatorial Pacific Ocean in the area known as the Nino 3.4 region, which is generally south of Hawaii between 5 degrees North and South Latitude. While the difference in ocean surface water temperature compared to normal, known as the sea surface temperature (SST) anomaly, reached the 0.5°C El Nino threshold in that region beginning late last fall, it was not until approximately February of 2015 when the Climate Prediction Center (CPC) observed that the atmospheric circulation pattern over the Pacific had responded to these sea surface temperature anomalies such that it became consistent with El Nino. In short, El Nino SSTs tend to support fairly persistent showers and thunderstorms in an area of the tropics where they usually occur much less often. Over time, the persistent showers and thunderstorms affect the strength of the jet stream and the pressure patterns near them, which ultimately results in the El Nino seasonal weather effects we experience. Since the initial issuance of an El Nino Advisory by the CPC late last winter, the El Nino oceanic pattern and the atmospheric pattern have become increasingly coupled as SST anomalies in the Nino 3.4 region have continued to generally increase. CPC forecasters are unanimously expecting a strong El Nino, likely rivaling the record 1997-98 El Nino in terms of strength. *cont. on next pg.*



How does El Nino Affect Weather and Climate?

According to the CPC, during an El Nino episode, tropical convection and heating in the lower atmosphere increases in the Central Equatorial Pacific Ocean in response to the El Nino SST pattern. This results in the eastward extension of the normal subtropical high pressure ridges in both hemispheres. This eastward extension of these high pressure areas tightens the temperature difference on the northern side of them, most notably during the winter months in the Northern Hemisphere when the polar night cools the high latitudes. This tightened pressure gradient results in a prolonged eastward extension of the mid-latitude jet stream across the Pacific Ocean. Due to the location of the subtropical ridges, we typically also see a southward shift in the jet stream over the eastern Pacific Ocean.

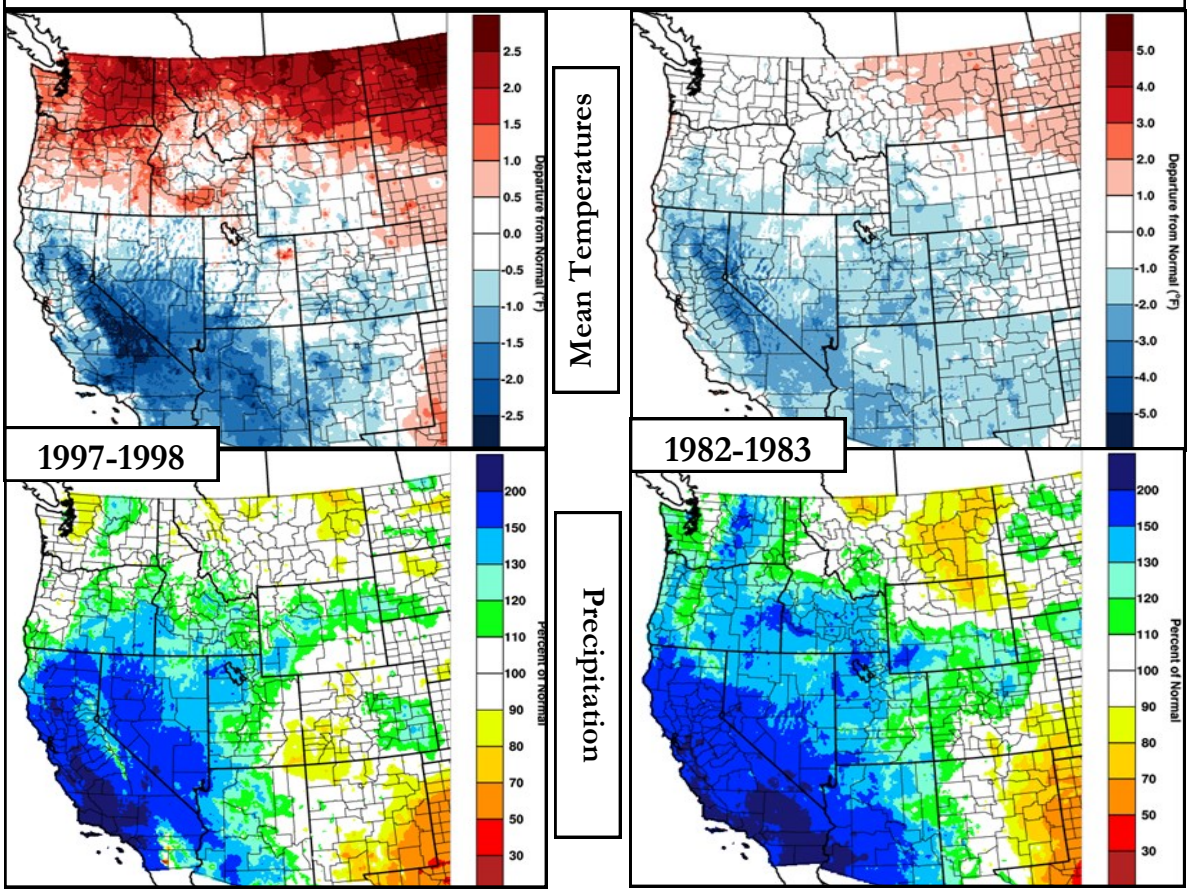
Is It All About El Nino? Factoring in the PDO:

While El Nino is strongly believed to be the dominant mode of variability affecting SSTs and the resultant atmospheric circulation patterns in the tropical Pacific Ocean, there are other less understood SST anomaly oscillations that occur on longer time scales than the 3-5 year El Nino cycle and at higher latitudes in the Pacific. One of these is the Pacific Decadal Oscillation or PDO, which is believed to have two primary modes of variability- one of 15-25 years, and the other of 50-70 years. While PDO and El Nino are clearly related to one another due to the movement of water by ocean currents and atmospheric circulation anomalies, they are measures of SST patterns in different portions of the Pacific. In short, the PDO measures SST anomalies in the interior North Pacific as they compare to SST anomalies along the North American coast. For the Pacific Northwest, astute climatologists often use both the El Nino cycle and the PDO together in predicting weather for the upcoming wet season. In short, studies indicate that a stronger than normal Aleutian Low, a semi-permanent feature of Northern Hemisphere winter, is favored during both an El Nino and the warm phase of the PDO.

What Similar Past Years Indicate:

While no two years are exactly the same due to the myriad of factors that affect weather and climate, climatologists often look at past similar years to determine what the future might be like. A favored technique in our forecast area is to look at the El Nino Southern Oscillation Signal (ENSO) and the PDO, concurrently, since these are the two dominant indicators of SST variability in the Pacific Ocean that most affect the oceanic and atmospheric circulations resulting in our seasonal weather. The upcoming wet season of 2015-16 appears to most closely resemble those of 1997-98, 1957-58, 1972-73, 1982-83, 1965-66, and 1987-88. Of these six wet seasons, three of them were very wet across our forecast areas in northern California and southern Oregon. The three others featured primarily below normal precipitation, though two had areas of near normal precipitation along and near the coast and one over the southern half of the area. While temperatures anomalies varied, they tended to be near to below normal in the very wet El Niño's and near to slightly above normal in the drier ones. The image to the right shows how the two wet seasons that are tracking most similarly to this year in the Pacific Ocean ended up. *cont. on next pg.*

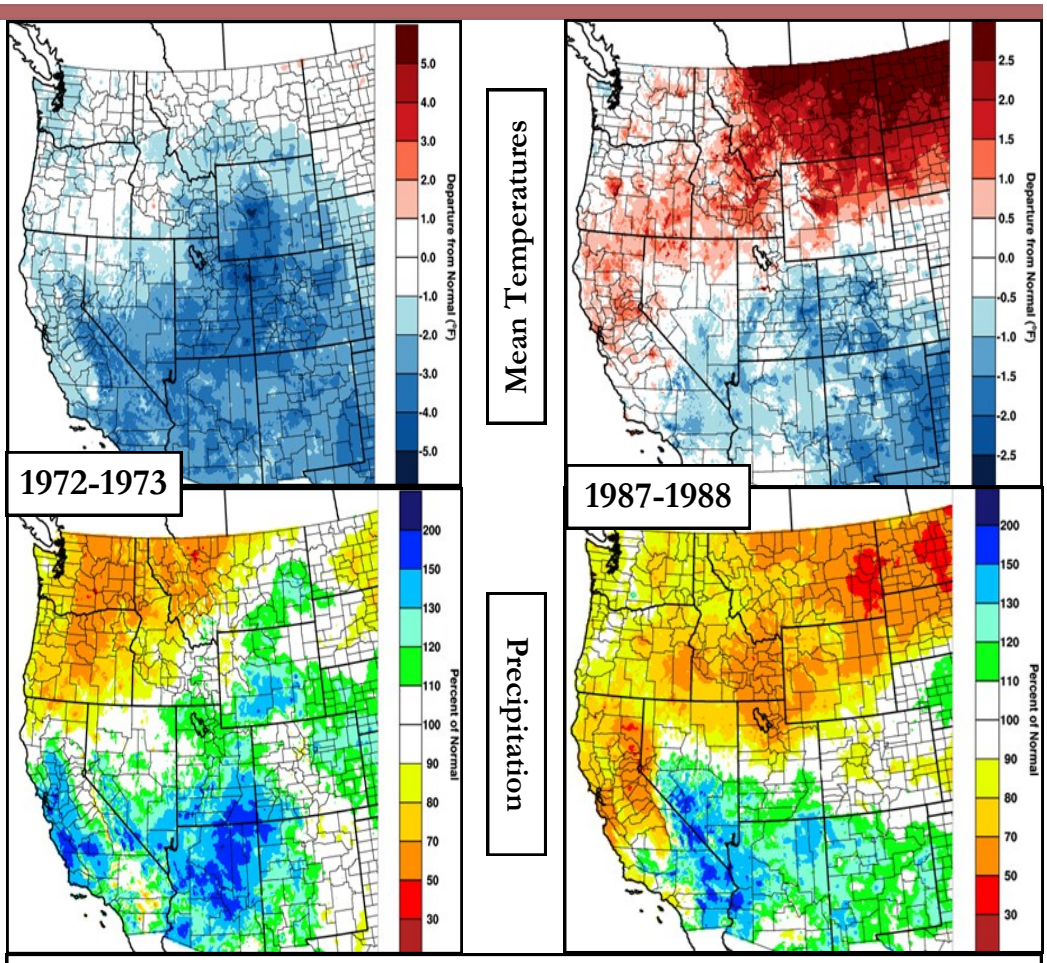
Top row shows the departure from normal values of mean temperatures from October through September. The bottom row shows percent of normal for precipitation during the same time frame. The left side is 1997-1998, while the right side is 1982-1983. Data: WestWide Drought Tracker—WRCC/UI Data Source—PRISM (Final)



Unfortunately, even with the strong climate anomaly of this strong El Nino, we can only indicate how the odds are tilted for our wet season weather. Should El Nino defy forecasts and not strengthen as much as expected it is possible we could see conditions like were experienced in 1972-73 or even 1987-88, shown on the right.

A study accomplished here at the Medford office in 2009-10 indicates that strong El Niños greatly increase the possibility of anomalously wet conditions along with near to below normal temperatures for Mount Shasta City, CA during at least one month in the December-March period. In fact the chance of a 10"+ precipitation month there during that time period under such a situation is >90%. This means that significant snowfall at normal elevations is highly likely for at least one of the winter months. Meanwhile, the same study found no correlation to precipitation in Medford, OR with El Niños of any strength.

Information gathered from the Climate Prediction Center and other data sources indicate that most strong El Niños in our forecast area result in:



Top row shows the departure from normal values of mean temperatures from October through September. The bottom row shows percent of normal for precipitation during the same time frame. The left side is 1972-1973, while the right side is 1987-1988. Data: WestWide Drought Tracker—WRCC/UI Data Source—

- Increased chances for drier and warmer than normal conditions in southern Oregon and northern California in the fall months of October-November-December. However, it is possible for one of these months to still be wetter than normal.
- Increased chances of at to above normal precipitation, especially from the Siskiyou Mountains southward.
- Increased chances of below normal precipitation north of the Roseburg area, and Crater Lake National Park area northward.
- Mountain snowfall has a greater chance of being at or above normal from the Siskiyous southward, but a higher probability of being lesser than normal and at a higher elevation than normal north of the Siskiyous.
- The tendency for downslope wind storms for the Rogue Valley appears to be enhanced due to the more persistent and stronger low pressure in the Gulf of Alaska.

Relative to the last couple of wet seasons, we expect this year is most likely to be both wetter and colder, with the exception of late November and December of 2013, which were record breaking cold for many valley areas. Thus, we expect drought conditions to lessen over the area. If we do, indeed, end up with events like those of 1997-98 and 1982-83, we could even see some areas come out of drought altogether.

Sources and Useful/Additional Information:

⇒ https://www.ncdc.noaa.gov/teleconnections/enso/indicators/sst.php

⇒ http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html

⇒ http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensocycle/enso_circ.shtml

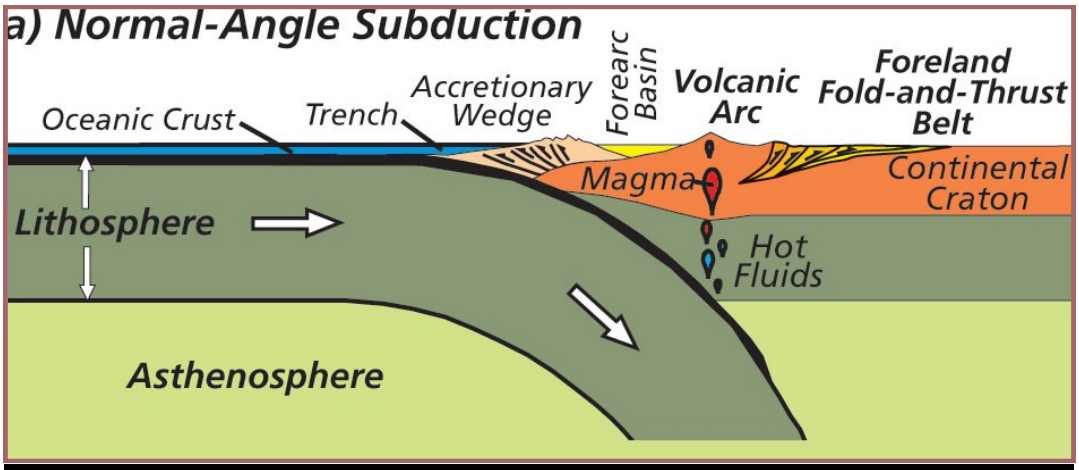
⇒ http://research.jisao.washington.edu/pdo/

⇒ http://www.tandfonline.com/doi/abs/10.1577/1548-8446(1999)024%3C0006%3AIPR%3E2.0.CO%3B2#.VfEI3hHBzRY

The Earthquake Everyone Seems to Ignore

Brad Schaaf, *Meteorologist Intern*

When people think of earthquakes, what comes to mind for most people is the San Andreas Fault in California. But another fault line exists closer to the Pacific Northwest. This fault has the potential to release a far more devastating earthquake than the San Andreas Fault—similar to the earthquake that caused the devastation in Japan back in 2011, but it hasn't done so since 1700. This has allowed for a sense of complacency to befall most people. That is, until a series of news stories recently came out describing the risks of "the big one."



Subduction zone illustration. Photo Credit: R.J. Lillie c/o National Park Service

Understanding how earthquakes occur is a relatively new science. The idea of plate tectonics was originally proposed by Alfred Wegener in 1912, but the first significant advances in the theory began in the 1950s. The idea is that our lithosphere, the solid layers of the Earth's crust and solid upper mantle, is composed of many pieces like a jigsaw puzzle. These pieces, called tectonic plates, move freely above the softer mantle. The energy to produce earthquakes forms at the boundaries where these plates slide against or over one another.

As the Juan de Fuca Plate, located off the Pacific Northwest coast, slowly slides under the edge of the North American Plate, energy builds—like pulling a rubber band. Eventually enough energy will build and the rubber band will snap, or in this case, the tectonic plates will lurch and the energy is released. This sudden movement produces waves that we perceive at the surface as shaking. The strength of an earthquake is based on a logarithmic scale called the Richter scale. This means that the energy released from a magnitude 6 earthquake is about 32 times stronger than a magnitude 5 earthquake. The shaking caused by a magnitude 8 or 9 earthquake along the Cascadia fault will likely cause catastrophic damage to most places west of the Cascades.

Example of a Tsunami Hazard Zone

In addition to the shaking, portions of the plates will quickly rise while others lower. When these changes occur along the seabed, the suddenly displaced water will try to even itself out; and a wave forms—a tsunami. Depending on the positioning of the wave, the water at the coast may recede—sometimes exposing a great deal of previously submerged shoreline. Other times, the onslaught of rushing water will arrive without warning. Either way, if one is in a tsunami evacuation zone, the best course of action will be to immediately get to higher ground after the shaking of the earthquake stops.

At this point, you may be asking yourself, "What can I do to prepare for an event like an earthquake?" The answer is similar to much of the advice that we give to people regarding all hazards: Create a disaster supply kit, and draft a plan. If you live in an evacuation zone or are visiting the beach, take time to plan where you're going to go when an earthquake strikes. It's also good to practice your plan. October 15 at 10:15 am, is Oregon and California's Great Shakeout earthquake drill. This annual event is a great time to practice what you should do during an earthquake and where to go if you live near the coast. *cont. on next pg.*

cont. from previous pg.

At the NWS office in Medford, we understand the risks and hazards that earthquakes and tsunamis present. Each year, we train and practice our earthquake plans in order to make sure we are familiar with the procedures when it comes time to act. Furthermore, the NWS and FEMA have teamed up to provide wireless emergency alerts. Besides the shaking of the actual earthquake, the first warnings may come right to your cell phone. In addition, the USGS is teaming up with several partners to create a phone application that will serve as an earthquake early warning system called Shake Alert.

We are teaming up with emergency managers across southern Oregon and northern California in order to effectively communicate preparedness strategies and plans. This has culminated in several events this September as part of national preparedness month. Such events included a disaster preparedness event in Ashland and in Coos Bay on the 12th, as well as an earthquake talk on the 16th and a preparedness fair on the 19th in Medford. Additionally, FEMA is also encouraging people to participate in their PrepareAthon on the 30th.

Frequently Asked Questions

John Lovegrove, *Meteorologist-In-Charge*

The National Weather Service is a pretty accessible federal agency. Who else in the federal government can you call at any time of the day or night and ask any question (hopefully regarding weather) on your mind. When I say at any time, I mean it. I have personally answered many questions at 3 am. With all of the questions we receive, there are some recurring themes.

One question is why is the official Medford observation at the airport. This can also apply to several of cities in the area (and nationwide) but Medford is usually the target of the question here. The reason is entirely linked to aviation. For good reason, pilots are very interested in weather at airports. You only have to go back about 15 to 20 years when all complete weather observations required a person to take them. A complete observation includes sky cover, visibility, temperature, dew point, wind and pressure. Complementary to these weather elements are maximum/minimum temperature and precipitation. Due to the workload required to maintain accurate observations, the number of locations was limited so they were placed where we could get the most bang for the buck - airports.

The long history of observations at airports also maintains a continuity so that temperature and precipitation records have meaning. When an observation site is moved, there are strict requirements to ensure it is a compatible move so that records can be maintained. If the requirements are not met, one station is closed and a new one begins.

There are now automated stations at select airports that can provide complete weather observations. Limited resources preclude deploying a large number of these systems. Small, self-contained weather stations are also available for home use that can do a good job with temperatures and wind. These stations must be sited properly to ensure high quality data. The NWS can't use such stations for official purposes due to the question of stability. We can't be sure how long the equipment will be available.

Variations in weather conditions occur everywhere. We call these changes microclimates. Even in the park near my home where we walk our dogs sometimes has dramatic changes in temperature around the grounds. Because of these variations, it is impossible to assess the conditions everywhere in a city. We have to pick a single location and call it the official site. The NWS will continue to use airport sites for official observations because of the reliability, stability and long history.

George Carlin had a routine called "Al Sleet, the Hippy-Dippy Weatherman." Part of the bit went like this: "Out at the airport, it's 75 degrees, which is stupid because no one lives at the airport. Downtown is much hotter. Downtown is on fire." Hopefully, I've been able to explain here why we use airports. I'll address additional frequent questions in the coming issues of the *Crater Chronicle.*

Improving Communication in Our Products

Shad Keene, *General Forecaster*

NWS Medford issues a host of hazard products, which are essentially watches, warnings, and advisories for various hazardous weather conditions. Hopefully, we communicate at least four things to you in these hazard products:

1. What hazardous weather to expect
2. When to expect hazardous weather
3. What/who will be impacted by the hazardous weather
4. **What you can do** to protect yourself, family, and/or property

NWS Medford will be experimenting with item number 4 this winter by enhancing the content and format of the precautionary/preparedness actions (PPAs) found at the bottom of the hazard product. We're researching the most significant threats for each weather hazard (heat, snow, etc.), and we're adding information that will help the reader to reduce these threats. Additionally, we're using research to help format the statements to make them more legible. The outcome should be a more user-friendly and actionable product, especially for our media partners who will be able to quickly and easily read and digest this portion of the product.

Though we're still refining the content and format of the PPAs, below is an example of a reformatted Winter Storm Warning PPA. If you have any feedback on this process, please email noel.keene@noaa.gov.

CURRENT Precautionary/Preparedness Actions

A WINTER STORM WARNING FOR HEAVY SNOW MEANS SEVERE WINTER WEATHER CONDITIONS ARE EXPECTED OR OCCURRING. SIGNIFICANT AMOUNTS OF SNOW ARE FORECAST THAT WILL MAKE TRAVEL DANGEROUS. IF YOU MUST TRAVEL...KEEP AN EXTRA FLASHLIGHT...FOOD...AND WATER IN YOUR VEHICLE IN CASE OF AN EMERGENCY.

NEW Precautionary/Preparedness Actions

- TRAVEL IS STRONGLY DISCOURAGED BECAUSE OF DANGEROUS CONDITIONS.
- KEEP A FLASHLIGHT, BLANKETS, FOOD, AND WATER WITH YOU.
- THE SAFEST PLACE IN A WINTER STORM IS INDOORS.

Ashland is *StormReady*

Ryan Sandler, *Warning Coordination Meteorologist*

Ashland Mayor John Stromberg (left) displays the StormReady certificate and Fire Chief John Karns (right) displays the StormReady sign, received by NWS representative Ryan Sandler (center).

The National Weather was proud to recognize Ashland as a StormReady community on September 2nd. StormReady recognition means Ashland has demonstrated a high level of severe weather readiness as part of a Weather-Ready Nation.

On New Year's Day in 1997 Ashland was ground zero for extensive flooding. This damaging flood led to a Presidential Disaster Declaration followed by the formation of volunteer Citizen Emergency Response Teams (CERT) in their community. These CERT volunteers are trained to help the community prepare and respond to disasters.

In 2010, the Oak Knoll wildfire destroyed 11 homes in Ashland. Soon after, Oak Knoll Meadows became the first Firewise community in Ashland. The Firewise program emphasizes homeowner responsibility and community participation in wildfire home safety.

Ashland has a culture of community which is best demonstrated through volunteerism, outreach, and education of their citizens.

Through Ashland's Fire and Rescue, Terri Eubanks has organized more than 200 CERT volunteers. For a city of just over 20,000 that's an incredible accomplishment. CERT has led the "Map Your Neighborhood" effort and organized many preparedness workshops and drills.

The National Weather Service congratulates the leaders and citizens of Ashland for making their community better educated and prepared for severe weather.

StormReady®

For more information on the *StormReady* program, visit the websites below:

⇒ http://www.stormready.noaa.gov/

⇒ http://www.stormready.noaa.gov/resources/toolkit.pdf

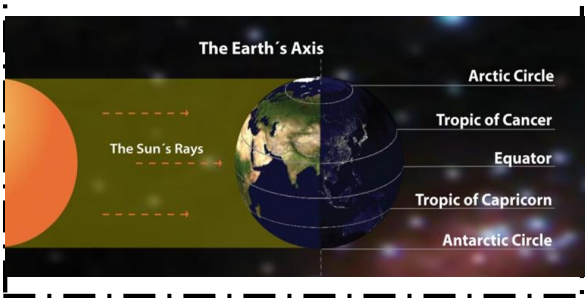
⇒ http://www.stormready.noaa.gov/commaps/or-com.htm

Weather-Ready Nation
National Oceanic and Atmospheric Administration

Astronomy Happenings

Misty Duncan, *Meteorologist Intern*

The autumnal equinox., A.K.A the fall equinox, occurs on September 23rd at 1:20 a.m. PDT. Why such an exact time? That is when the earth's equator is perpendicular to the sun's rays. This also means that there is an equal amount of time during both day and night: 12 hours. Hence the word "equinox", which comes from Latin meaning equal night.



Another total lunar eclipse is set to occur on September 27th this year. The west coast will only get to see a portion of the show because the beginning stages will begin at 5:11 p.m. PDT which is before moonrise.

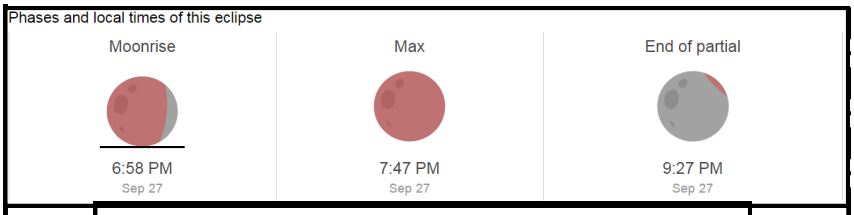
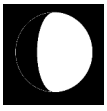


Image: http://www.timeanddate.com/eclipse/in/usa/medford

Once the moon rises at 6:57 p.m. PDT, the eclipse will be near totality, which begins at 7:11 p.m. PDT. The moon will be close to the horizon during the total eclipse, which ends at 8:23 p.m. PDT; so be sure to have a clear view to the East.

	Draconids	Orionids	South Taurids	North Taurids	Leonids	Geminids
Active Period	Oct. 6th – Oct. 10th	Oct. 4th – Nov. 14th	Sept. 7th – Nov. 19th	Oct. 19th – Dec. 10th	Nov. 5th – Nov. 30th	Dec. 4th – Dec. 16th
Peak Date	Oct. 8th	Oct. 22nd	Nov. 4th thru Nov. 5th	Nov. 12th and 13th	Nov 17th and 18th	Dec 13th and 14th
Best time to view	Just before nightfall and right after sunset	After midnight and just before dawn	Late night on the 4th until dawn of the 5th	Late night on the 12th until dawn of the 13th	After midnight	Mid-evening until dawn
# meteors/hour	~20…sometimes hundreds	~10 to 20	~5-10	~5-10	~10-15…can be many more	~50-100…rivaling the Perseids
Moon Phase	Waning crescent, rising late @ night 	Waxing gibbous, sets before peak viewing 	Waning crescent, rising before dawn 	New 	Waxing crescent, setting in the evening 	Waxing crescent setting shortly after the sun 
Comet of Origin	Giacobini-Zinner	Halley	Encke	Encke	Tempel-Tuttle	Phaethon
Constellation of Origin/Radiant	Draco	Orion, near Betelgeuse	Taurus	Taurus	Leo	Gemini, near Castor and Pollox
Highlights			Fireballs	Fireballs		Good for young viewers

- The **Taurids** are known for producing "Fireballs". These are exceptionally bright meteors that have the brightness similar to that of or greater than the planet Venus. Sometimes, these "fireballs" will explode with a bright flash as they enter the atmosphere. According the American Meteor Society (AMS), there seems to be a frequency of seven years with fireballs. The last notable showing was in 2008. Could 2015 could be the next memorable year? If you happen to see one, the AMS asks that you report them here: http://www.amsmeteors.org/fireballs/
- The activity with the **Geminids** picks up around 9-10 pm so this could be a good event for the younger viewers since they won't need to stay up all night to see the show.

Upcoming Spotter Talks

The National Weather Service invites weather watchers to a free severe weather spotter training program.

The National Weather Service uses reports collected from spotters across the region to determine the severity of both winter and summer storms. Meteorologists will explain the types of storms we receive in Southern Oregon, show you how to use a rain gauge, and how and what to report.

There is no cost for this training. For more information or questions about the Spotter program, contact Ryan Sandler at 541-776-4303 #223 or email ryan.sandler@noaa.gov

Where	**Mount Shasta City, CA**	**Gold Beach, OR**	**Medford, OR**	**Grants Pass, OR**	**Klamath Falls, OR**
Location	Mt. Shasta City Park's Lower Lodge. 1315 Nixon Rd, Mount Shasta City, CA	SW Oregon Community College Center. 29392 Ellensburg Ave, Gold Beach, OR	Carnegie Building, downtown Medford. Across from City Hall. 413 W Main St.	Location is TBD	Location is TBD
When	Thursday, October 1st @ 630 pm—830 pm	Wednesday, October 7th @ 2:00 pm—3 pm	Thursday, October 8th @ 6:00 pm—8 pm	Tuesday, October 13th. Time is TBD	Wednesday, October 14th. Time is TBD

National Weather Service - Medford, Oregon

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Our Vision

Professionals focusing on science, teamwork, and customer service to design and deliver the best decision-support information to our community.

Our Mission

Our team at the National Weather Service Office in Medford strives to deliver the best observational, forecast, and warning information through exceptional customer service, extensive training and education, maintaining quality electronic systems, and relying upon an outstanding team of weather spotters and cooperative observers. We do this within the overall mission of the NWS to build a Weather-Ready Nation:

To provide weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

Our Values

Trust, Integrity, Professionalism, Service, Teamwork, Ingenuity, Expertise, and Enthusiasm.

About Us

The Weather Forecast Office in Medford, Oregon, is one of more than 120 field offices of the National Weather Service, an agency under the National Oceanic and Atmospheric Administration and the United States Department of Commerce. The Weather Forecast Office in Medford serves 7 counties in southwestern Oregon and 2 counties in northern California, providing weather and water information to more than a half-million citizens. We are also responsible for the coastal waters of the Pacific Ocean from Florence, Oregon, to Point St. George, California, extending 60 miles offshore. The office is staffed 24 hours a day, 7 days a week, and 365 days a year by a team of 26 meteorologists, hydrologists, electronic technicians, hydrometeorological technicians, and administrative assistants, under the direction of Meteorologist-In-Charge John Lovegrove.